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Job No.: CTCE/BBMP/W.No.14/KRIDL/BC/AIV/2016-17 17.10.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and drain at Karekallu, Vinayakanagar in Ward No.14, T. Dasarahalli Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/DD/WO/48/2016-17 Dated: 29.07.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	17.10.2016

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Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	303	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.02	22.11	**22.06**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

Note:

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BC/Shape.T/2016-17 : 17.10.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Improvements to Roads and drain at Karekallu, Vinayakanagar in Ward No.14, T. Dasarahalli Sub Division, BBMP, Bangalore.
Reference	: BBMP/EE/DD/WO/48/2016-17 Dated: 29.07.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 17.10.2016

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Result : Flakiness Index = **11.08%**

Elongation Index = **13.28%**

Result : Combined Flakiness & Elongation index **24.36%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BC/Stripping/2016-17 19.10.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and drain at Karekallu, Vinayakanagar in Ward No.14, T. Dasarahalli Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/DD/WO/48/2016-17 Dated: 29.07.2016
Type of Mix	Bituminous Concrete
Date of Testing	19.10.2016

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Type of binder : 60/70

Percentage of binder used : 5.00% by wt.

Total weight of aggregate : 200 g

Total weight of binder : 10.00 g

Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

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Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BC/Sp_Wa/2016-17 19.10.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and drain at Karekallu, Vinayakanagar in Ward No.14, T. Dasarahalli Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/DD/WO/48/2016-17 Dated: 29.07.2016
Type of Mix	Bituminous Concrete
Date of Testing	19.10.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	1999	2005	2006	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1239	1238	1251	
4	Weight of saturated surface dry aggregate in air	W_3 g	2020	2022	2023	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	781	784	772	
6	Weight of oven dried aggregate	W_4 g	2010	2009	2008	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.574	2.563	2.601	2.579
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.607	2.606	2.653	2.622
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.50%	0.65%	0.75%	0.63%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No: CTCE/BBMP/W.No.14/KRIDL/BC/Bitumen/2016-17 19.10.2016

BITUMEN CONTENT DETERMINATION OF BITUMINOUS CONCRETE MIX

As per IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads and drain at Karekallu, Vinayakanagar in Ward No.14, T. Dasarahalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/DD/WO/48/2016-17 Dated: 29.07.2016
SAMPLE I/D	Roads at Vinayakanagara (Karekallu) Ward No.14, BBMP, Bangalore.
DATE OF TESTING	19.10.2016

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BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	473
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	27.00
7. Bitumen content in %	5.20	5.40
8. Average	**5.30**	

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Job No: CTCE/BBMP/W.No.14/KRIDL/BC/Bitumen/2016-17 19.10.2016

BITUMEN CONTENT AFTER GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

As Per IS 2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads and drain at Karekallu, Vinayakanagar in Ward No.14, T. Dasarahalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/DD/WO/48/2016-17 Dated: 29.07.2016
SAMPLE I/D	Roads at Vinayakanagara (Karekallu) Ward No.14, BBMP, Bangalore.
DATE OF TESTING	19.10.2016

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	45.36	9.57	9.57	90.43	79-100
9.5	36.31	7.66	17.23	82.77	70-88
4.75	75.12	15.85	33.08	66.92	53-71
2.36	68.25	14.40	47.48	52.52	42-58
1.18	41.23	8.70	56.18	43.82	34-48
0.6	53.32	11.25	67.42	32.58	26-38
0.3	45.36	9.57	76.99	23.01	18-28
0.15	34.12	7.20	84.19	15.81	12-20
0.075	42.32	8.93	93.12	6.88	4-10

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	35.56	7.52	7.52	92.48	79-100
9.5	44.26	9.36	16.88	83.12	70-88
4.75	64.25	13.58	30.46	69.54	53-71
2.36	66.32	14.02	44.48	55.52	42-58
1.18	73.12	15.46	59.94	40.06	34-48
0.6	43.13	9.12	69.06	30.94	26-38
0.3	36.25	7.66	76.72	23.28	18-28
0.15	38.56	8.15	84.87	15.13	12-20
0.075	36.39	7.69	92.57	7.43	4-10

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BC/Agg/2016-17 19.10.2016

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of theWork	Improvements to Roads and drain at Karekallu, Vinayakanagar in Ward No.14, T. Dasarahalli Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/DD/WO/48/2016-17 Dated: 29.07.2016
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	19.10.2016

Total Weight of Sample: **5150** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	630	12.23	12.23	87.77	79 - 100	
9.5	460	8.93	21.17	78.83	70 - 88	
4.75	635	12.33	33.50	66.50	53 - 71	
2.36	510	9.90	43.40	56.60	42 - 58	
1.18	625	12.14	55.53	44.47	34 - 48	
0.600	525	10.19	65.73	34.27	26 - 38	
0.300	565	10.97	76.70	23.30	18 - 28	
0.150	430	8.35	85.05	14.95	12 - 20	
0.075	485	9.42	94.47	5.53	4 - 10	

Total Weight of Sample: **5250** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	625	11.90	11.90	88.10	79 - 100	
9.5	490	9.33	21.24	78.76	70 - 88	
4.75	630	12.00	33.24	66.76	53 - 71	
2.36	545	10.38	43.62	56.38	42 - 58	
1.18	625	11.90	55.52	44.48	34 - 48	
0.600	530	10.10	65.62	34.38	26 - 38	
0.300	550	10.48	76.10	23.90	18 - 28	
0.150	495	9.43	85.52	14.48	12 - 20	
0.075	465	8.86	94.38	5.62	4 - 10	

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BC/Stability/2016-17 19.10.2016

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	:	Improvements to Roads and drain at Karekallu, Vinayakanagar in Ward No.14, T. Dasarahalli Sub Division, BBMP, Bangalore.
Reference	:	BBMP/EE/DD/WO/48/2016-17 Dated: 29.07.2016
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	19.10.2016

The results of the tests conducted on the bituminous concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.10	9.20	9 Kn (min)
2	Marshal flow, mm	2.90	3.05	2 – 4
3	Percent air voids in Mineral Aggregate	3.40	4.10	3 – 6
4	Voids in Compacted Mix	14.25	13.25	13 – 15
5	Percent Voids filled with Bitumen	68.55	69.60	65 - 75
6	Density, g/cc	2.27	2.28	--

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